CLAIMS

What is claimed is:

1. A method for solving a respiratory tract model comprising the steps of:

selecting a group of input parameters associated with a respiratory tract model;

computing a probability density function for each of said input parameters in said group; and,

solving said respiratory tract model associated with said input parameters using said computed probability density functions.

2. The method of claim 1, wherein said selecting step comprises the step of selecting a group of input parameters associated with a respiratory tract model, said respiratory tract model comprising the ICRP-66 Respiratory Tract Model.

3. The method of claim 2, wherein said selecting step comprises the step of selecting a group of input parameters associated with a respiratory tract model, said parameters comprising at least one parameter selected from the group of parameters associated with the ICRP-66 Respiratory Tract Model.

4. The method of claim 1, wherein said solving step comprises the step of generating at least one of a mean estimate, a median estimate and an uncertainty of a radiation dose based upon said computed probability density functions.

5. The method of claim 1, further comprising the step of modifying said respiratory tract model to explicitly represent anatomical structures of a human being.

6. The method of claim 5, wherein said modifying step comprises the step of modifying said respiratory tract model to explicitly represent anatomical structures of a human being, said structures comprising at least one of an external nose, nasal cavity, nasal sinus, larynx, pharynx, trachea, main bronchus and esophagus.

7. A machine readable storage having stored thereon a computer program for solving a respiratory tract model, the computer program comprising a routine set of instructions for causing the machine to perform the steps of:

selecting a group of input parameters associated with a respiratory tract model;

computing a probability density function for each of said input parameters in said group; and,

solving said respiratory tract model associated with said input parameters using said computed probability density functions.

8. The machine readable storage of claim 7, wherein said selecting step comprises the steps of selecting a group input parameters associated with a respiratory tract model, said respiratory tract model comprising the ICRP-66 Respiratory Tract Model.

9. The machine readable storage of claim 8, wherein said selecting step comprises the step of selecting a group input parameters associated with a respiratory tract model, said

parameters comprising at least one parameter selected from the group of parameters associated with the ICRP-66 Respiratory Tract Model.

10. The machine readable storage of claim 7, wherein said solving step comprises the step of generating at least one of a mean estimate, a median estimate and an uncertainty of a radiation dose based upon said computed probability density functions.

11. The machine readable storage of claim 7, further comprising the step of modifying said respiratory tract model to explicitly represent anatomical structures of a human being.

12. The machine readable storage of claim 11, wherein said modifying step comprises the step of modifying said respiratory tract model to explicitly represent anatomical structures of a human being, said structures comprising at least one of an external nose, nasal cavity, nasal sinus, larynx, pharynx, trachea, main bronchus and esophagus.

13. A system for solving a respiratory tract model comprising:

a scenario specification module for defining an exposure scenario;

a Latin Hypercube sampling module;

a particle deposition module for repeatedly computing a particle deposition component of a respiratory tract model, and a clearance component module for repeatedly computing a clearance component of said respiratory tract model;

a dose matrix computing component for computing a dose matrix for alpha particles;

an MCNP module both for determining absorbed beta particle fractions and for determining specific absorbed photon fractions;

a dose computation module for computing equivalent doses and combined doses in target tissues; and,

an interface through which statistical representations are provided from said deposition, said clearance and said dose computation modules.

14. The system of claim 13, wherein said statistical representations comprise at least one of a minimum, maximum, median, mean, standard deviation, coefficient of variance, geometric mean, geometric standard deviation and percentile.

15. The system of claim 13, wherein said respiratory tract model is an ICRP-66 Respiratory Tract Model.